Engine data

	Genset	Marine	O & G	Rail	C & I
Application	X				
Engine model	20V4000G84F				
Fuel type	EN590				
Application Group	3D				
Legislative body	Fuel-consumption optimized				
Test cycle	D2				
Fuel sulphur content [ppm]	5				
mg/mN^3 values base on residual oxygen value of [%]	5				

Engine raw emissions*

Cycle point	[-]	n1	n2	n3	n4	n5
Power	kW	2848	2137	1425	712	285
Power relative	[-]	1	0.75	0.5	0.25	0.1
Engine torque	Nm	18144	13608	9072	4536	1814
Engine torque relative	[-]	1	0.75	0.5	0.25	0.1
Engine speed	1/min	1499	1500	1500	1500	1500
Engine speed relative	[-]	1	1	1	1	1
Eff. mean pressure	bar	23.92	17.94	11.96	5.98	2.39
Number of turbocharger	[-]	6	6	6	6	6
Test bench pressure	bar	0.963	0.964	0.964	0.964	0.964
Air pressure at humidity measurement position	bar	0.963	0.964	0.964	0.964	0.964
Air temperature at humidity measurement position	grdC	29.3	26.4	24	21.8	20.5

Intake air humidity absolut	g/kg	6.3	6.2	6.2	6	6.3
Intake air temperature	grdC	27.6	25.7	23.3	22.4	20.1
Exhaust back pressure after ETC (static)	mbar	30.6	16.2	7.6	2.3	1.1
Exhaust temperature after ETC	grdC	515	485	447	357	228
Exhaust pressure at AMA measurement position	mbar	1	0	0	-1	-1
Exhaust temperature at AMA measurement position	grdC	515	485	447	357	228
Nitrogen oxide (NO_x) (5% O_2)	ppm	1563	2043	1619	979	1215
NO_X correctionfactor	[-]	0.966	0.957	0.952	0.944	0.944
NO_X concentration corr. (5% O_2)	ppm	1510	1956	1541	924	1146
Carbon monoxide (CO) (5% O_2)	ppm	201	105	103	265	688
Carbon dioxide (CO_2)	%	9.1	8.9	8	5.9	3.5
Oxygen (O_2)	%	8.2	8.6	9.8	12.6	15.9
Hydrocarbon (HC) (5% O_2)	ppm	56	71	88	150	359
Formaldehyde (HCHO) (5% O_2)	ppm	5	6	5	10	28
Filter smoke number	Bosch	0.18	0.23	0.27	0.69	0.19

Exhaust mass flow wet	kg/h	13698	10335	7889	5858	4825
Exhaust volume flow (norm) (5% O_2)	m^3/s	2.94	2.22	1.69	1.26	1.04
Exhaust volume flow (real) (5% O_2)	m^3/s	8.65	6.37	4.65	3.04	2
Exhaust volume flow dry (based on $_5$% O_2)	m^3/s	2.16	1.59	1.11	0.62	0.32
NO_X mass flow	kg/h	26.18	24.89	13.55	4.48	2.8
CO mass flow	kg/h	1.96	0.75	0.52	0.74	0.99
CO_2 mass flow	kg/h	1738	1280	887	495	249
O_2 mass flow	kg/h	1145	902	789	774	817
HC_1 mass flow	kg/h	0.29	0.27	0.23	0.22	0.26
SO_2 mass flow	g/h	5.587	4.111	2.847	1.591	0.802
PM mass flow	kg/h	0.065	0.053	0.062	0.129	0.127
NO_X-Emissions specific	g/kWh	9.19	11.65	9.51	6.29	9.83
CO-Emissions specific	g/kWh	0.69	0.35	0.36	1.04	3.47
CO_2-Emissions specific	g/kWh	610.4	599.1	622.3	694.6	873
HC_1-Emissions specific	g/kWh	0.103	0.128	0.165	0.308	0.929
SO_2-Emissions specific	g/kWh	0.002	0.0019	0.002	0.0022	0.0028
PM-Emissions specific (Meas.)	g/kWh	0.024	0.027	0.046	0.193	0.474

NO_X-Emissions (based on $_5$% O_2)	mg/m^{3}N	3484	4545	3575	2121	2579
	ppmV	1869	2422	1890	1118	1349
CO-Emissions (based on $_5$% O_2)	mg/m^{3}N	252	131	129	332	860
CO_2-Emissions (based on $_5$% O_2)	mg/m^{3}N	223577	223818	222696	221113	216252
HC_1-Emissions (based on $_5$% O_2)	mg/m^{3}N	38	48	59	98	230
SO_2-Emissions (based on $_5$% O_2)	mg/m^{3}N	0.719	0.719	0.715	0.711	0.697
PM-Emissions (based on $_5$% O_2)	mg/m^{3}N	8.8	9.9	16.5	61.5	117.4
Dust (meas. O_2)	mg/m^{3}N	1.7	2.9	6	22.9	24.2
Dry-wet correction factor	[-]	0.921	0.923	0.93	0.947	0.966

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Test cycle	D2				
Fuel sulphur content [ppm]	5				
mg/mN^3 values base on residual oxygen value of [%]	5				

Not to exceed emission values*

Cycle point	[-]	n1	n2	n3	n4	n5
Power	kW	2848	2137	1425	712	285
Power relative	[-]	1	0.75	0.5	0.25	0.1
Engine speed	1/min	1499	1500	1500	1500	1500
Engine speed relative	[-]	1	1	1	1	1
NO_X concentration corr. (5% O_2)	ppm	1963	2542	2003	1386	2178
Carbon monoxide (CO) (5% O_2)	ppm	342	178	197	531	1376
Hydrocarbon (HC) (5% O_2)	ppm	95	121	168	299	1041
Formaldehyde (HCHO) (5% O_2)	ppm	9	10	10	20	82
NO_X mass flow	kg/h	34.04	32.36	17.61	6.72	5.32
CO mass flow	kg/h	3.33	1.27	0.98	1.49	1.98
HC_1 mass flow	kg/h	0.5	0.46	0.45	0.44	0.77
NO_X+HC_1 mass flow	kg/h	34.54	32.82	18.06	7.16	6.09

PM mass flow	kg/h	0.097	0.085	0.093	0.193	0.47
NO_X-Emissions specific	g/kWh	11.95	15.14	12.36	9.44	18.68
CO-Emissions specific	g/kWh	1.17	0.59	0.69	2.08	6.95
HC_1-Emissions specific	g/kWh	0.175	0.217	0.313	0.615	2.695
NO_X+HC_1-Emissions specific	g/kWh	12.13	15.36	12.67	10.05	21.37
PM-Emissions specific (Meas.)	g/kWh	0.036	0.042	0.069	0.29	1.753
NO_X-Emissions (based on $_5$% O_2)	mg/m^{3}N	4530	5908	4647	3182	4901
	ppmV	2430	3149	2457	1677	2563
CO-Emissions (based on $_5$% O_2)	mg/m^{3}N	428	222	246	663	1720
HC_1-Emissions (based on $_5$% O_2)	mg/m^{3}N	64	81	112	196	667
NO_X+HC_1-Emissions (based on $_5$% O_2)	mg/m^{3}N	4594	5989	4759	3378	5568
PM-Emissions (based on $_5$% O_2)	mg/m^{3}N	13.2	15.9	24.7	92.2	434.4
Dust (meas. O_2)	mg/m^{3}N	2.6	4.6	9	34.3	89.5

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